

PERFORME ARITHMETIC OPERATIONS WITH COMPLEX NUMBERS

$$\begin{aligned}(2+5i) \cdot (3-i) + \frac{1}{2}i(4-8i) &= 6 - 2i + 15i - 5i^2 + 2i - 4i^2 \\ &= 6 + 15i - 5(-1) - 4(-1) \\ &= 6 + 15i + 5 + 4 \\ &= 15 + 15i\end{aligned}$$

$$\begin{aligned}\left(\frac{1}{2} + \frac{\sqrt{3}}{2}i\right)^2 &= \left(\frac{1}{2} + \frac{\sqrt{3}}{2}i\right)\left(\frac{1}{2} + \frac{\sqrt{3}}{2}i\right) \\ &= \frac{1}{4} + \frac{\sqrt{3}}{4}i + \frac{\sqrt{3}}{4}i + \frac{3}{4}i^2 \\ &= \frac{1}{4} + \frac{2\sqrt{3}}{4}i + \frac{3}{4}(-1) \\ &= \frac{1}{4} + \frac{\sqrt{3}}{2}i - \frac{3}{4} \\ &= -\frac{2}{4} + \frac{\sqrt{3}}{2}i = -\frac{1}{2} + \frac{\sqrt{3}}{2}i\end{aligned}$$

$$2i^4(1+i^2) = 2 \cdot 1 [1+(-1)]$$

$$= 2 \cdot 0$$

$$= 0$$

$$6i^3 - 4i^5 = 6(-i) - 4(i)$$

$$= -6i - 4i$$

$$= -10i$$

$$\begin{aligned}i^3 &= -i \\ i^5 &= i\end{aligned}$$

$$\begin{aligned}i^4 &= 1 \\ i^2 &= -1\end{aligned}$$